

ALTERNATIVES ANALYSIS



Nearly 50 alternatives were analyzed for their potential to meet the study goals and objectives.

SELECTION OF ALTERNATIVES

For purposes of the study, the term *alternative* is used to mean *a choice between two or more things or among those things to be chosen*. The term is not meant to indicate a completely different choice of methods from those currently used by Caltrans. The vegetation management alternatives discussed include methods currently used, modifications of current methods, and new methods not currently used.

A broad range of nearly 50 vegetation management alternatives was compiled through research and consultation with various groups and organizations. University and independent studies, product literature, and trade publications were reviewed and analyzed. Several "brainstorming sessions" on vegetation management strategies and methods were attended by RVMC representatives, PALs representatives, technical experts, and Caltrans staff at various levels. Jones & Stokes Associates' staff traveled to the districts to observe conditions in each district and evaluate vegetation management challenges and methods with district staff.

The strategies used by other California state and local agencies, other state departments of transportation, and other organizations in dealing with these same challenges were explored as well. Because of environmental, geographical, and economic diversity, California presents more varied challenges than those confronting other states. However, many of the methods used in other states may be useful because the individual challenges they face are similar.

STUDY METHODOLOGY

An alternatives analysis process was developed for screening, evaluating, ranking, and determining the applicability of vegetation management strategies. Five systematic tables were devised for the alternatives analysis. The analysis tables were developed to provide fair and consistent relative rankings of the vegetation management alternatives as evaluated for their potential to address the study goals and objectives for meeting the statewide challenges. The tables were designed to be flexible and repeatable for use by Caltrans' staff to evaluate the best alternative on a segment-specific basis. The *Alternative Evalua-*

tion Form is condensed from the alternatives analysis and allows design, maintenance, and planning staff to evaluate the anticipated suitability of an alternative to a specific roadway segment or project. The relative importance of each objective may be weighted to address the specific needs of that particular district or project.

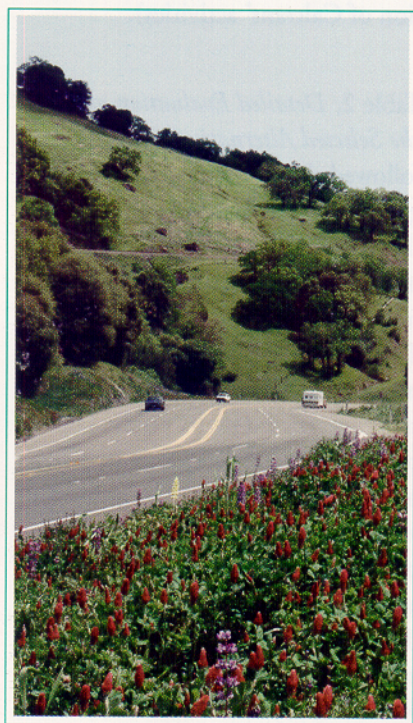


Table 1, *Initial Screening of the Alternatives*, poses each alternative against the question of whether it is indeed a prescribed vegetation management strategy, and further asks whether the alternative has the potential to address each of the six study objectives (increasing public safety, increasing worker safety, improving the environment, decreasing herbicide use, decreasing life cycle costs, and improving public perception of Caltrans' activities).

Table 2, *Detailed Evaluation of the Selected Alternative*, similarly followed the study objectives but gauged the potential of the alternative to address specific subcriteria under each objective, and assigned numerical values to the responses. The 17 subcriteria represent the major concerns under each general criterion; for example, public safety concerns are subdivided as visibility, health, fire, and traffic. The numerical value was multiplied by a weighted percentile to arrive at a relative percentage for each alternative, with 100 as the highest score. The weighted percentiles were determined by the RVMC as follows:

Alternative	Does the Alternative Address the Purpose?	Does the Alternative Address the Objectives?						Comments
		Nonpoint Source Management Strategy	Reduce Public Safety	Reduce Surface Erosion	Improve Aesthetic Quality	Reduce Hydrologic Load	Improve Public Perception	
10. Raking	yes	no	maybe	no	maybe	maybe	maybe	Excessive fuel growth, does not erode potential
11. grading	yes	maybe	no	maybe	no	maybe	maybe	Excessive erosion
Thermal Methods								
12. Hot Tamping	yes	maybe	maybe	maybe	maybe	maybe	maybe	Excessive an overly concern
13. brookline burning	yes	no	no	maybe	maybe	no	maybe	Excessive in soil quality, no erosion surface soil
14. spot steam application	yes	maybe	no	maybe	maybe	no	maybe	No long term effects, requires more application
15. solar	yes	no	maybe	maybe	maybe	no	maybe	Excessive surface erosion
Biological Methods								
16. mulched vegetation	yes	yes	yes	yes	yes	yes	yes	See Table 2, 3
17. grasses or herbaceous vegetation	yes	yes	yes	yes	yes	yes	yes	See Table 2, 3
18. evergreen in roadside	yes	no	no	maybe	maybe	maybe	yes	Excessive public and worker risk and herbicide problem
19. grazing	yes	yes	yes	yes	yes	maybe	maybe	Excessive public and worker risk

[illegible]

- ◆ increase public safety (25%)
- ◆ increase worker safety (25%)
- ◆ improve environmental quality (15%)
- ◆ reduce herbicide use (15%)
- ◆ provide cost-effective vegetation management (15%)
- ◆ improve public perception (5%)

Table 3, *Applicable Locations for Selected Alternative*, categorizes the corridor segment by ecoprovince, topography, adjacent development and land use, fire concerns, right-of-way location, adjacent roadway features, and climatic factors. An affirmative response indicates the general suitability of the alternative for the locational variables under each category.

Table 4 is a *Summary of Alternatives Evaluation*. The table indicates the rank and score of each alternative, whether the alternative requires further testing, and a general comment about that particular alternative. An affirmative response for requiring further testing indicates that the alternative is suitable for a demonstration project, as discussed in the following section.

Table 5, *Alternative Cost Effectiveness and Efficacy Potential*, shows relative costs for installation and ongoing maintenance for each alternative over a 20-year life cycle period and the estimated percentage of herbicide reduction the alternative has the potential to achieve.

Table 3a. Applicable Locations for Selected Alternative

[illegible]

Table 4. Summary of Alternatives Evaluation

Read Time Table	Read Time Table	Alternative Models with Number and Description	Alternative Model Number	Comments
1	1	25. reduced word count strategy	1	Effective in the first and second
2	2	30. paraphrasing	2	Effective in the first and second
3	3	70. paraphrasing with close paraphrasing	3	Not well understood globally
4	4	50. word substitution	4	Not well understood globally
5	5	11. hierarchical grouping	5	Effective in the first and second
6	6	12. hierarchical grouping	6	Effective in the first and second
7	7	13. hierarchical grouping	7	Effective in the first and second
8	8	14. hierarchical grouping	8	Effective in the first and second
9	9	20. parent-child and grand child	9	Effective in the first and second
10	10	21. parent-child and grand child	10	Effective in the first and second
11	11	22. parent-child and grand child	11	Effective in the first and second
12	12	23. parent-child and grand child	12	Effective in the first and second
13	13	24. parent-child and grand child	13	Effective in the first and second
14	14	25. parent-child and grand child	14	Effective in the first and second
15	15	26. parent-child and grand child	15	Effective in the first and second
16	16	27. parent-child and grand child	16	Effective in the first and second
17	17	28. parent-child and grand child	17	Effective in the first and second
18	18	29. parent-child and grand child	18	Effective in the first and second
19	19	30. parent-child and grand child	19	Effective in the first and second
20	20	31. parent-child and grand child	20	Effective in the first and second
21	21	32. parent-child and grand child	21	Effective in the first and second
22	22	33. parent-child and grand child	22	Effective in the first and second
23	23	34. parent-child and grand child	23	Effective in the first and second
24	24	35. parent-child and grand child	24	Effective in the first and second
25	25	36. parent-child and grand child	25	Effective in the first and second
26	26	37. parent-child and grand child	26	Effective in the first and second
27	27	38. parent-child and grand child	27	Effective in the first and second
28	28	39. parent-child and grand child	28	Effective in the first and second
29	29	40. parent-child and grand child	29	Effective in the first and second
30	30	41. parent-child and grand child	30	Effective in the first and second
31	31	42. parent-child and grand child	31	Effective in the first and second
32	32	43. parent-child and grand child	32	Effective in the first and second
33	33	44. parent-child and grand child	33	Effective in the first and second
34	34	45. parent-child and grand child	34	Effective in the first and second
35	35	46. parent-child and grand child	35	Effective in the first and second
36	36	47. parent-child and grand child	36	Effective in the first and second
37	37	48. parent-child and grand child	37	Effective in the first and second
38	38	49. parent-child and grand child	38	Effective in the first and second
39	39	50. parent-child and grand child	39	Effective in the first and second
40	40	51. parent-child and grand child	40	Effective in the first and second
41	41	52. parent-child and grand child	41	Effective in the first and second
42	42	53. parent-child and grand child	42	Effective in the first and second
43	43	54. parent-child and grand child	43	Effective in the first and second
44	44	55. parent-child and grand child	44	Effective in the first and second
45	45	56. parent-child and grand child	45	Effective in the first and second
46	46	57. parent-child and grand child	46	Effective in the first and second
47	47	58. parent-child and grand child	47	Effective in the first and second
48	48	59. parent-child and grand child	48	Effective in the first and second
49	49	60. parent-child and grand child	49	Effective in the first and second
50	50	61. parent-child and grand child	50	Effective in the first and second
51	51	62. parent-child and grand child	51	Effective in the first and second
52	52	63. parent-child and grand child	52	Effective in the first and second
53	53	64. parent-child and grand child	53	Effective in the first and second
54	54	65. parent-child and grand child	54	Effective in the first and second
55	55	66. parent-child and grand child	55	Effective in the first and second
56	56	67. parent-child and grand child	56	Effective in the first and second
57	57	68. parent-child and grand child	57	Effective in the first and second
58	58	69. parent-child and grand child	58	Effective in the first and second
59	59	70. parent-child and grand child	59	Effective in the first and second
60	60	71. parent-child and grand child	60	Effective in the first and second
61	61	72. parent-child and grand child	61	Effective in the first and second
62	62	73. parent-child and grand child	62	Effective in the first and second
63	63	74. parent-child and grand child	63	Effective in the first and second
64	64	75. parent-child and grand child	64	Effective in the first and second
65	65	76. parent-child and grand child	65	Effective in the first and second
66	66	77. parent-child and grand child	66	Effective in the first and second
67	67	78. parent-child and grand child	67	Effective in the first and second
68	68	79. parent-child and grand child	68	Effective in the first and second
69	69	80. parent-child and grand child	69	Effective in the first and second
70	70	81. parent-child and grand child	70	Effective in the first and second
71	71	82. parent-child and grand child	71	Effective in the first and second
72	72	83. parent-child and grand child	72	Effective in the first and second
73	73	84. parent-child and grand child	73	Effective in the first and second
74	74	85. parent-child and grand child	74	Effective in the first and second
75	75	86. parent-child and grand child	75	Effective in the first and second
76	76	87. parent-child and grand child	76	Effective in the first and second
77	77	88. parent-child and grand child	77	Effective in the first and second
78	78	89. parent-child and grand child	78	Effective in the first and second
79	79	90. parent-child and grand child	79	Effective in the first and second
80	80	91. parent-child and grand child	80	

Table 8. Alternative Cost-Effectiveness and Utility Results

Rank Table 1	Items Table 2	Alternative Identification and Descriptions	Cost per Unit	Life Cycle	Cost per Square Foot	Potential to Disrupt Biodiversity
1	90	21 reduced-width clear strips	\$10/meter run	25 years	\$1/meter run	5–10%
2	88	30 prefabricated vegetation	\$5/meter run	40 years	\$1.40/meter run	5–10%
3	79	16 greened with three conifers	\$30/meter run	90 years	\$1.40/meter run	0–5%
4	78	26 water-tolerant vegetation	\$10/meter run	40 years	\$1.40/meter run	5–10%
5	75	11 herbaceous meadows	\$30/meter run	30 years	\$3.00/meter run	5–10%
6	71	18 organic mulches	\$2/meter run	4 years	\$1.10/meter run	5–10%

21. **Reduced-width Clear Strips** assumes clear strip 1 meter wide maintained by mowing @ 500/m²/acre, quoted by Keith Robinson of Caltrans Maintenance Division.

28. *Preferred Vegetation from 1993 Caltrans Contract Cost Data (2005) WILDFLOWER SEEDING @ -5.55/square meter plus (2006) PLANT COVER*

18. **Geotextiles with Stone Overlay** from 1995 Caltrans Contract Cost Data (28114 ROCK BLANKET 4'-11" Super meter also (28113) ROCK

29. **Water Retention Areas** from 1955 Caltrans Contract Cost Data [1998]: BHA/ZWYF EXCAVATIONS @ .45 \$/cubic meter (translates to average depth of 1.5 ft)

17. **Horticultural Geobotany** from 1965 Caltrans Contract Cost Data [20786] FROGSON CONTRACT, BLANDETT'S & SUNDAREFF METTER, increased with

7200-ROCK SLOPE PROTECTION FABRIC 0-50square meter/plus Roll/roll 0-50-Square meter, quoted by Ray Myers of Road & Graham, Inc., Geosynthetic Division (Sacramento, CA)

18. **Organic Wulphers** from 1995 Caltrans Contract Cost data (20091) MULCH @-100wulphers meter divided by 17 (thickness depth of 3 inches, 39 inches/meter, 2003=0.3, \$90115=52.31¢)
